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Geospatial data dissemination: reality, obstacles and possibilities

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I. General Issues

What do we understand as dissemination of geospatial data? Is it enough to produce and distribute high-tech information products?

The following are critical issues that should be addressed as our starting point.

The interaction process between data producers and society

Often the main producers of geospatial data are "experts and highly specialized personnel" in governmental organizations and scientific institutions. Scientific communities sometimes have a tendency to view society with a degree of "arrogance." From our point of view, the process of information dissemination to society should be undertaken as a respectful interaction between data producers and data receivers.

The mere design and implementation of highly sophisticated products and services of geospatial data does not suffice in a comprehensive dissemination project. Through proper interaction processes, the construction of "knowledge bridges" between users and producers of geospatial data should be emphasized. In brief, the impact of geospatial data products and services on society should be assured via well-developed methodological approaches that give proper attention to the receiver.

The role of geospatial information in society

Deep thought should be given in dissemination processes to the role that geospatial data will play for individuals, organizations, institutions, the community or the nation. Too often, the scientists involved in data acquisition and processing are too caught up in the technical and technological tasks involved.

Due to its graphic nature, geospatial data is an effective means for communication. As such, geospatial data can be highly effective in public policy interaction processes. Geospatial data is unquestionably an important tool for military activities, planning, education, business management, and so on. This transversal characteristic points to the need to give thought to ethical and practical issues regarding the role and impact that the services and products of geospatial data will have on society.

The binomial relationship between information and knowledge

Rather than undertaking a philosophical discussion on the meaning of knowledge and its interrelation with information, we simply wish to point out that whenever data and information are disseminated, it is implicitly assumed that the user will incorporate it into his or her own knowledge framework/base.

The same data and information could lead to different interpretations by distinct individuals and societies. In order to be more effective, dissemination programs should take into account the knowledge framework of the receivers.

II. Constraining Forces

There are constraining forces in the dissemination process that are strongly related to cultural and organizational issues. Following, some of these forces are identified.

Attitudes. - The personal, organizational, and cultural attitudes involved in information management could be decisive when defining strategies and policies of data dissemination. Countries with well-established laws regarding the "right to information" will differ strongly from others where information is perceived as a privileged asset for those in power (a fiefdom). For example, while in the U.S. geospatial information is considered mostly a public asset, in most Latin American countries its dissemination is highly restricted.

Technological infrastructure. - Regional and social differences that determine the availability of information and communication technologies are very clear-cut. While the assimilation of new communication means such as the Internet is well advanced in the U.S., Canada, and some Western European countries, in Latin America it is still a comparatively scarce resource.

Scientific knowledge. - The degree of development of science in different regions and social groups also has an important impact on information dissemination. Systems Theory is without a doubt part of the crux of information management. A society where (private or public) organizations lack a culture of systematic data acquisition, processing, and updating could hardly have a well-established system of data dissemination.

Copyright. - Copyright laws and practices are well established in some countries, unfortunately in some others they are not. This issue poses serious problems for data producers since the dissemination process without copyright safeguards has an obvious impact on costs and marketing procedures.

III. Driving Forces

In a similar manner, there are driving forces affecting dissemination processes, such as:

Globalization. - Information technology and data dissemination are two of the main driving forces of globalization. Worldwide news is being publicized through the Internet; the market as a whole is taking advantage of telecommunication tools, individuals obtain information for their personal interest from newspapers, magazines, and the WEB, among others, and there are already hundreds of maps available on the Internet.

Although the dissemination of science occurs at varying velocities in different societies, historical trends indicate that electricity, telephones, and newspapers are assets that have been incorporated into a wide number of social groups around the world. We could therefore assume that other technological developments such as the Internet, computers, and cellular phones will someday become common goods for an ample sector of the population.

Scientific development. - Both knowledge and technology have substantially advanced in the last century. We could assume that the knowledge base will increase, that some of the information and communication technologies will be perfected, and that new technologies will surprise us.

The right to information. - More societies are becoming aware of citizens' right to information. Through different mechanisms of political pressure, citizens (as a whole) are obtaining more access to information.

IV. A Regional Scenario for Latin America

Culture (common origins and languages) strongly unifies Latin America as a region. Both the constraining and the driving forces are influencing the success or failure of geospatial dissemination processes. As a means of focussing on the issues that could affect the process in a positive manner, two scenarios for the year 2005 were explored. In the first one, it is assumed that current trends remain. In the second one, it is assumed that "adequate" public policies are implemented in order to promote a comprehensive process of geospatial data dissemination.

Current trends scenario

The setting. - Latin American society, including Mexico, Central and South America (except Belize and the Guyanas). Although Latin America is highly complex and heterogeneous, there are some similarities in the problems that geospatial data dissemination poses.

The actors. - Geospatial data producers are divided between civil government and the military. For example, in Mexico, Colombia, Guatemala, and Brazil, producers are governmental organizations within civil ministries; while in Peru, Argentina, and Chile, mapping organizations belong to the military.

As in many other countries, users include government, private and social organizations, researchers, students, and citizens.

The international community plays an important role both as producer and user. Satellite images, for example, are obtained from the U.S., Canada, or Europe. International

organizations such as the UN, the OECD, World Bank, and IDB are often both important users and producers of geospatial data for the region.

The play

First Act. - Latin America year 2000. The above-mentioned constraining and driving forces are performing. Government and international organizations continue to dominate the dissemination process of geospatial data. There is a lack of "information culture" and dissemination is very partial; people and organizations do not even share basic data such as topographic maps.

Data producers are highly inefficient due to a duplication of efforts in data acquisition and processing. Overall, the lack of copyright practices is having a strong impact on the development and marketing of services and products.

A few international projects such as the global mapping initiative, clearinghouse-building efforts, and other specific projects like the Continental Water Atlas are having some influence on the dissemination process.

On the other hand, the Internet is available and has an impact on privileged organizations and groups, which are taking advantage of the new IT. The more educated portion of society has access to the geospatial data disseminated by the international community.

Computers and the Internet are penetrating the business world, government, and society as a whole. Latin American society acknowledges the importance of computers and the Internet; however, they are still resources available only to privileged groups.

Politicians often speak of the relevance of education, information, and science. However, in Latin America, investment in any of these activities is far lower than needed, and even more so when compared, in relative terms, to the U.S., Canada, and some European countries.

The gap in scientific development between Latin America and the U.S. in terms of both knowledge and technologies is maintained. For example, in Mexico the impact of the Internet is about ten years behind the U.S. market. Although people have access to technology, a very small portion of information is actually used by Mexicans.

Final Act. - Latin America (year 2005). The Constraining and Driving Forces continue to have an impact. The Constraining Forces remain essentially unchanged; the Driving Forces are stronger due to developments in the industrialized regions.

New geographic information technologies are developed and the availability of computers and telecommunications has expanded around the world. However, there is still a significant gap between the assimilation of technology in the industrialized region and Latin America as a whole. Similarly, science has not been fully acknowledged by governments and only an elite group has access to new developments.

Users will have greater access to geospatial data produced in the industrialized region through the Internet. However, the "critical mass" of educated people needed to take full advantage of this resource is not in place. The design, production, and dissemination of geospatial information services and products continue to be mainly "producer driven."

YEAR 2005

Latin America is a "follower" regarding both knowledge and technology in Geographic Information Sciences and Management. Regional personnel are used for repetitive tasks.

Target scenario

The setting. - In the year 2001, the Constraining and Driving Forces continue to have an impact although several specific public policies regarding Geographic Information Management are implemented in the years 2002-2005 by the governments in conjunction with international organizations. The overall scenario for the region regarding geospatial dissemination processes develops some strategic changes.

Final Act. – In the year 2005, the governments of the region are more aware of the importance of copyright issues regarding geospatial data. Laws are established and copyright enforcement achieves significant advances.

Universities and research institutions in the region acknowledge the importance of education in Geographic Information Sciences (GIS); there are several graduate programs

in place as well as technical training programs. The first substantial results are programmed for the year 2010.

Beginning in the year 2002, a **crusade for capacity building** is promoted and sustained by international organizations including NGOs and regional organizations. A participatory approach is privileged with the incorporation of educated people from Latin America. Universities and government are working together in the region providing Latin American teachers for the "capacity-building crusade." As a result, in the year 2005, we find in place the "critical mass", of educated and trained personnel in Geographic Information Management, required to meet the demands of society.

Governments, international organizations, universities, and private and social sectors adopt an "information-sharing" culture. Millions of dollars are saved in the region by sharing "public geospatial data." The use of geospatial data is an input for strong analytical GIS solutions that adequately respond to the needs of society.

The design, production, and dissemination of geospatial information services and products are finally in a "demand driven" mode.

There is stronger global scientific participation in the region, contributing with solutions and technological innovations that are responding to regional interests and specific problems posed by society.

V. Final Comments

Geospatial data dissemination is an issue that has deep and wide-ranging implications on the regional information management scene. Although there are obvious differences in the Latin American region, similarities in key issues could allow for the design and implementation of similar public policies that would transform the role played by the region in Geographic Information Sciences and Management.

From our point of view, public policies should focus in the short and medium term on four strategic courses of action:

- Creating a new and strong tendency that incorporates universities, research institutes, interested groups, communities, organizations, and individuals into an open-minded, balanced framework capable of countering an ingrained older tendency.
- Designing dissemination processes which necessarily include efforts towards assuring a "critical mass" of educated people with the knowledge required to take full advantage of the geospatial information that producers are making available.
- Taking advantage of cooperative driving forces from outside and within that will contribute to capacity building, efficiency, information technology infrastructure, and leadership building in the region.
- Focusing efforts on strengthening the "information-sharing culture" always in conjunction with a growing "right to information" culture while taking into account the demands posed by society, all within well-established copyright laws and safeguards.

BY THE YEAR 2010

Latin America is a leader and not a follower in Geographic Information Sciences and Management.